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Brief research report

# A psychometric investigation of the Sociocultural Attitudes Towards Appearance Questionnaire-4-Revised among sexual minority adults in the U.S.

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ABSTRACT

The Sociocultural Attitudes Towards Appearance Questionnaire-4 Revised (SATAQ-4R) is a measure of internalization (or belief and acceptance) of muscular, thin/low body fat, and general attractiveness ideals; and of sociocultural pressures experienced from family, peers, media, and significant others to achieve the ideal body. The current study examined the psychometric properties of the SATAQ-4R scores in a sample of sexual minority (non-heterosexual) men and women. Confirmatory factor analysis was employed to examine the factor structure in men ($n = 479$) and women ($n = 482$). The original 7-factor structure was replicated, and internal reliability coefficients for the seven subscale scores were acceptable ($\geq .82$ α and ω). For men and women, the thin/low body fat, family, peers, media, and significant others subscales exhibited significant positive medium-to-large associations with subscale scores on the Eating Disorder Examination-Questionnaire (EDE-Q), measuring aspects of eating pathology. The muscular ideal subscale exhibited a significant large correlation with the Drive for Muscularity Scale (DMS), measuring muscularity-related concerns. Both the muscular ideal and general attractiveness ideal subscale exhibited significant small or non-significant correlations with eating pathology. In sum, the SATAQ-4R scores demonstrated acceptable reliability and structural and convergent validity in samples of sexual minority men and women.



## 1. Introduction

Sexual minority (SM) individuals (i.e., individuals whose sexual orientation, attraction, and/or behavior are non-heteronormative) exhibit higher levels of disordered eating behaviors, including fasting, binge eating, purging, and diet pill usage, as compared to heterosexual individuals (Matthews-Ewald et al., 2014; Meneguzzo et al., 2018; Watson et al., 2017). Furthermore, while epidemiological studies of diagnosed eating disorders in SM populations are rare, lifetime prevalence rates are higher in gay/bisexual men (5.2%) and lesbian/bisexual women (4.6%) as compared to heterosexual men (1.5%) and women (1.6%; Feldman & Meyer, 2007). Identifying mechanisms of eating disorder development in SM individuals is essential to ameliorate these health disparities.

According to the tripartite model, individuals perceive pressure from influential social agents to achieve the ideal body (Heinberg et al., 1995). Individuals then internalize (or believe) that this often unattainable body is desirable, leading individuals to experience body dissatisfaction and engage in disordered eating to alter their body to fit the ideal (van den Berg et al., 2002). The tripartite model is supported by preliminary work in SM men (Tylka & Andorka, 2012) and women (Hazzard et al., 2019; Huxley et al., 2015), but more research is necessary to establish causal pathways and any theoretical modifications that might be needed for this population.

In line with the tripartite influence model, the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ; Heinberg et al., 1995) is one of the most widely used measures of sociocultural risk factors for disordered eating and was recently revised with substantial changes (SATAQ-4R; Schaefer et al., 2017). There are now two separate versions of the SATAQ-4R for men and women that

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contain 20 identical items with a total of 28 items in the SATAQ-4R-Male and 31 items in the SATAQ-4R-Female. Both versions produce seven subscales (Internalization: Thin/Low Body Fat; Internalization: Muscular; Internalization: General Attractiveness; Pressures: Family; Pressures: Peers; Pressures: Significant Others; and Pressures: Media), with a differing number of items by subscale and gender. The recent inclusion of the Significant Others subscale is particularly relevant as research has demonstrated strong links between romantic partners, SM communities, and body image in SM individuals (Brown & Keel, 2015; Tylka & Andorka, 2012). Therefore, because adequate measurement of sociocultural pressures and internalization is essential for future research into the tripartite influence model as it applies to SM, it is important to examine the psychometric properties of SATAQ-4R scores in SM men and women.

We are unaware of any study examining the psychometric properties of SATAQ-4R scores for SM individuals. Therefore, the present study examined internal consistency and structural and convergent validity of SATAQ-4R scores in SM men and women. The 7-factor structure found by Schaefer et al. (2017) was expected. The SATAQ-4R Thin/Low Body Fat and pressures subscales were expected to exhibit medium-to-large positive associations with eating pathology. Based on the findings of Schaefer et al., the Muscular and General Attractiveness subscales were expected to exhibit small-to-medium positive associations with eating pathology. Because there are some concerns that muscularity-related concerns and behaviors are not adequately measured by conventional measures of eating pathology (Smith et al., 2017), the Muscular subscale validity was also examined for its association with drive for muscularity with a large positive correlation expected (Schaefer et al., 2017).

## 2. Method

Participants were 479 SM men ($M_{age}$ = 24.03, *SD* = 3.76) and 482 SM women ($M_{age}$ = 23.33, *SD* = 3.69) recruited for participation across the United States through the online survey software company Qualtrics. The majority of the sample identified their ethnicity as non-Hispanic (75.8%). Non-Hispanic participants identified as White (33.1%), Black or African American (32.4%), Asian/Pacific Islander (34.2%), and Native American or American Indian (0.3%). Hispanic participants identified as White (56.3%), Black or African American (24.7%), Asian/Pacific Islander (9.1%), and Native American or American Indian (10.0%). Most of the sample identified as bisexual (58.7%), followed by lesbian or gay (35.0%), other (4.3%), and asexual (2.1%). All participants endorsed equal attraction to men and women or primary attraction to same-gender partners.

### 2.1. Recruitment

Data were collected from April to July 2018 through Qualtrics Panel, an online survey company that allows individuals to register for research studies. Potential participants were sent a de-identified invite for a 15–20 minute online survey. Participants were eligible if they met the following criteria: (a) between the ages of 18 and 30 years old (to replicate the sample studied in Schafer et al. [2017]); (b) endorse same gender attraction; (c) self-identify as either African American, Non-Hispanic White, Asian American/Pacific Islander, or Hispanic with any other race; and (d) English speaking. Participants received $4 US dollars in e-currency, administered by Qualtrics, for participating in the study. All procedures were reviewed and approved by the San Diego State University Institutional Review Board.

### 2.2. Measures

#### 2.2.1. SATAQ-4R

Participants completed the SATAQ-4R-Male or the SATAQ-4R-Female developed by Schaefer et al. (2017) based on their self-identified gender. Items are rated on a 5-point Likert scale from 1 *(definitely disagree)* to 5 *(definitely agree)*. Higher scores indicate greater internalization or pressures.

#### 2.2.2. Eating Disorder Examination-Questionnaire (EDE-Q)

The EDE-Q (Fairburn & Fairburn and Beglin, 2008) is 28-item self-report questionnaire that assesses the frequency of disordered eating attitudes and behaviors. It produces a global score, as well as four subscales (Restraint, Eating Concern, Weight Concern, and Shape Concern). Items are rated on a 7-point frequency scale from 0 (*no days*) to 6 (*every day*). Higher scores indicate higher disordered eating attitudes and behaviors. While initially developed and validated in women, the EDE-Q has demonstrated acceptable reliability and validity in SM men (Blashill & Vander Wal, 2009) and reliability in SM women (Davids & Green, 2011). In the full sample, the internal consistency of the EDE-Q global score and subscales scores was acceptable ($\alpha \geq .83$ and $\omega \geq .84$), as well as separately for men ($\alpha \geq .83$ and $\omega \geq .83$) and women ($\alpha \geq .84$ and $\omega \geq .84$; see supplemental information).

#### 2.2.3. Drive for Muscularity Scale (DMS)

The DMS (McCreary, 2007; McCreary & Sasse, 2000) is a 15-item self-report questionnaire that assesses muscularity-oriented attitudes and behaviors. This scale has been validated in a sample of SM men (DeBlaere & Brewster, 2017), but its psychometric properties in SM women are unknown. Items are rated on a 6-point frequency scale from 1 (*never*) to 6 (*always*). Higher scores indicate increased desire for muscularity. In the current sample, internal consistency of the scores of the global scale was acceptable (whole sample $\alpha$ = .92, $\omega$ = .92; men $\alpha$ = .89, $\omega$ = .89; women $\alpha$ = .92, $\omega$ = .92).

### 2.3. Statistical analysis

Reactive Monte Carlo simulations indicated that our sample would be adequately powered to conduct confirmatory factor analyses (CFA) separated by gender (Muthén & Muthén, 2002), as necessitated by different items for men and women in the SATAQ-4R. Given that both univariate and multivariate tests of normality indicated that the items were not normally distributed, CFAs were conducted utilizing diagonally weighted least squares (DWLS) method of estimation for model parameters and the full weighted matrix for calculation of robust standard error, and mean- and variance-adjusted test statistics (Li, 2016). Comparative fit index (CFI), root mean squared error of approximation (RMSEA), and standardized root mean square residual (SRMR) were utilized to assess for model fit. Guidelines for adequate model fit suggest CFI values of .90 or higher, SRMR values of .08 or lower, and RMSEA values of .08 or lower (Bentler, 1990; Hu & Bentler, 1999; Russell, 2002). The chi-square goodness-of-fit statistic was also examined; however, this metric is almost always significant with large samples (Bentler & Bonett, 1980). Internal consistency was assessed using ordinal Cronbach's alpha and ordinal omega, with values greater than .80 for alpha and values greater than .70 for omega considered adequate internal consistency (Bernard, 2012; Dunn et al., 2014).These analyses were conducted using R version 3.6.0 (R Core Team, 2019; Rosseel, 2012).

Means, standard deviations, and intercorrelations by subscale were calculated. Convergent validity was assessed using Pearson *r* product-moment correlations. Small, medium, and large associations were identified as .10, .30, and .50, respectively (Cohen, 1992). Missing data were mean imputed; less than 1% of all data was

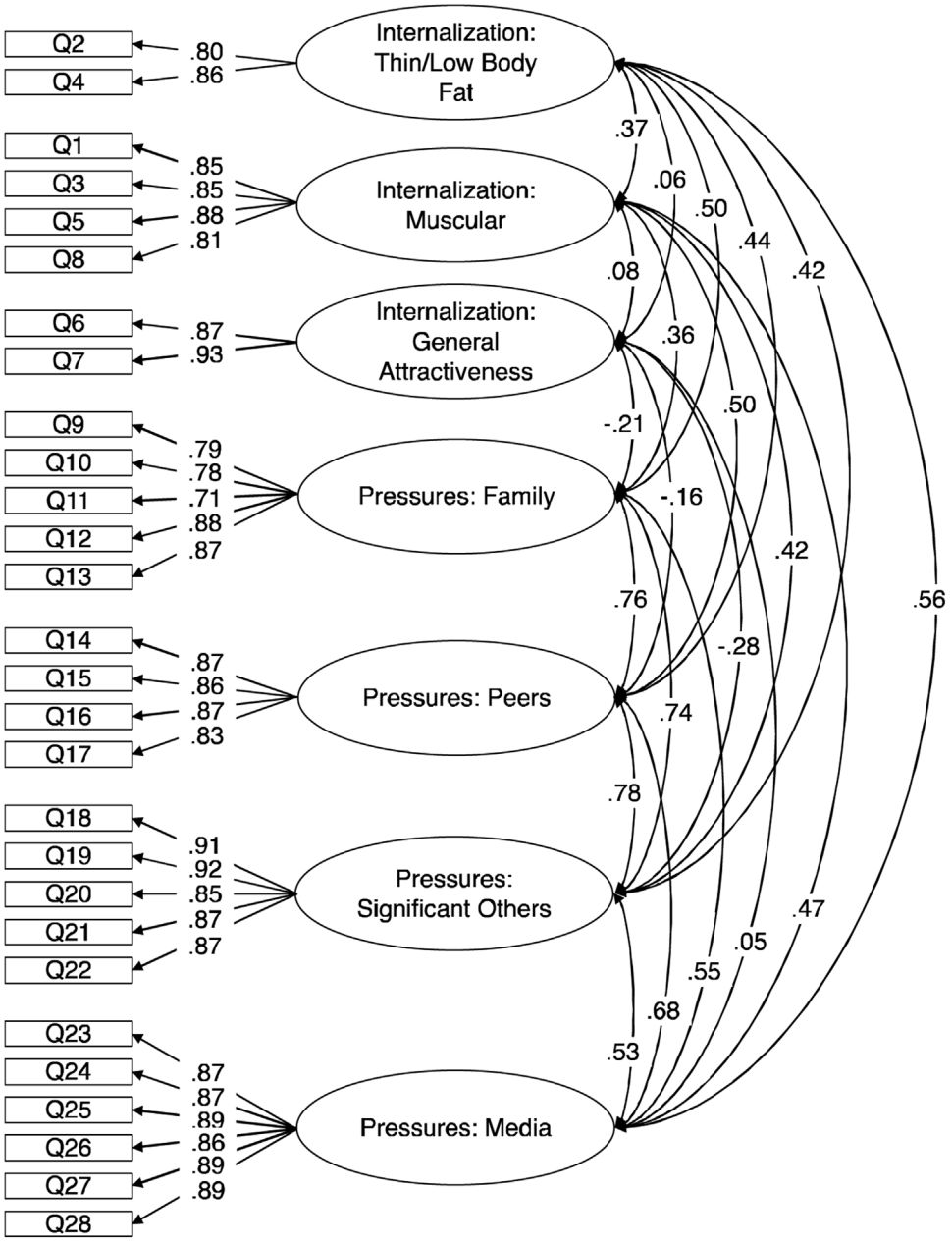


**Fig. 1.** Confirmatory Factor Analysis Factor Loadings for Men.

*Notes.* Factor loadings and covariances are standardized.

imputed in this manner and Little's MCAR test was non-significant, $\chi^2(925) = 884.758$, $p = .83$. These analyses were conducted using SPSS 25 (IBM Corp., 2017).

## 3. Results

### 3.1. Confirmatory factor analysis

In men, results from the CFA indicated that the 7-factor solution was an acceptable fit to the data according to CFI, RMSEA, and SRMR, $\chi^2(329) = 1273.85$, $p < .001$, CFI = .98, RMSEA = .08, and SRMR = .06. All items exhibited significant loadings (greater than .40) on expected factors (see Fig. 1). In women, results from the CFA indicated that the 7-factor solution was an acceptable fit to the data according to CFI, RMSEA, and SRMR, $\chi^2(413) = 1418.48$, $p < .001$, CFI = .98, RMSEA = .07, and SRMR = .08. All items exhibited significant loadings (greater than .40) on expected factors (see Fig. 2).

### 3.2. Internal consistency

Internal consistency for the SATAQ-4R subscale scores was adequate-to-strong. Associations between subscale scores were significant and ranged from small-to-large positive interrelationships. However, for men, the General Attractiveness subscale demonstrated either significant negative or non-significant relationships with all other subscales. For women, the General Attractiveness subscale was not significantly correlated with the Muscular subscale or the Significant Others subscale, but exhibited small-to-large positive correlations with other subscales. See supplemental information for full results.

### 3.3. Convergent validity

As hypothesized in both men and women, the Thin/Low Body Fat and Pressures subscales scores exhibited significant medium-

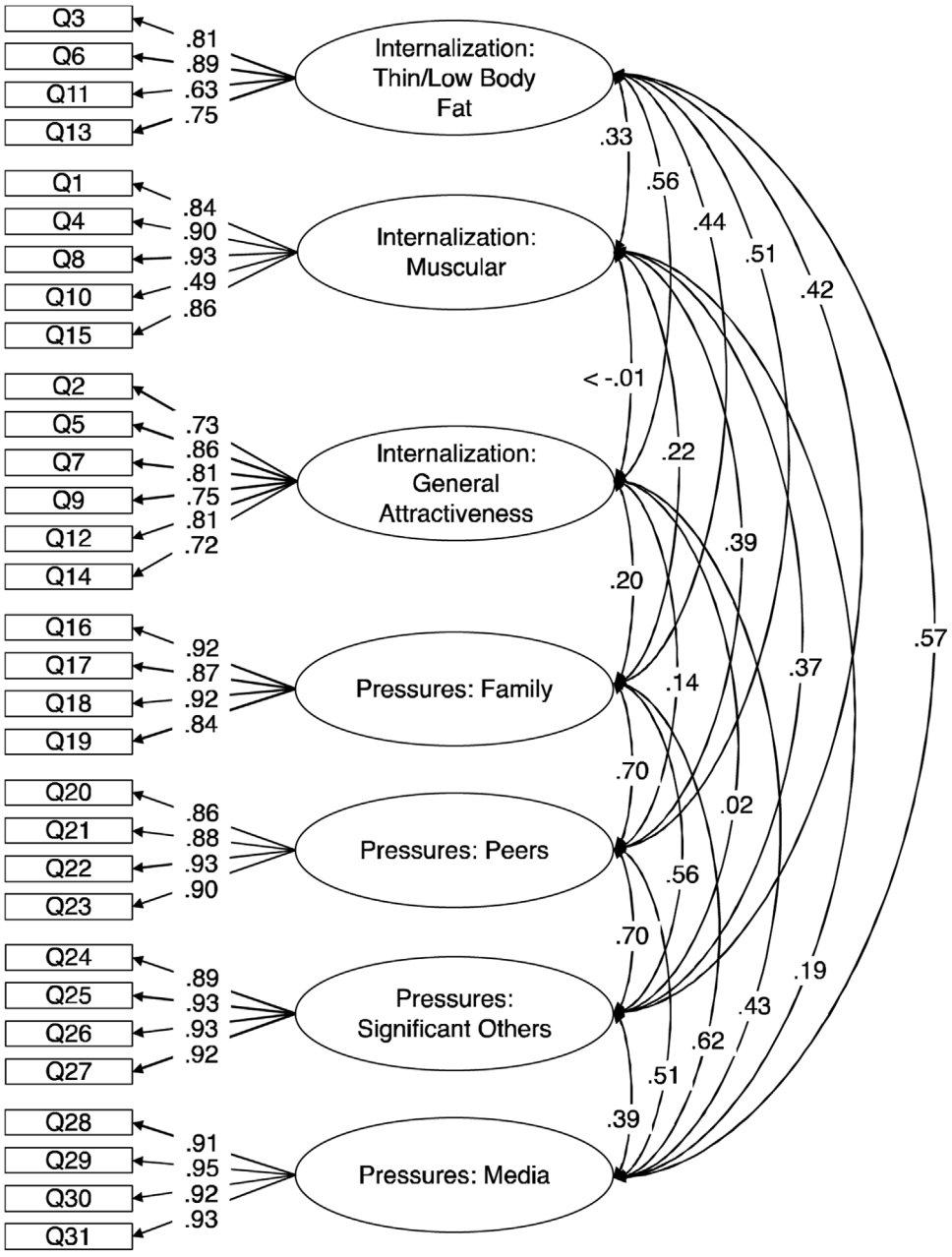


**Fig. 2.** Confirmatory Factor Analysis Factor Loadings for Women.

*Notes.* Factor loadings and covariances are standardized.

to-large positive associations with eating pathology scores (see supplemental information). In addition, the Muscular subscale score exhibited a significant large positive association with the DMS score. In men, the Muscular subscale had a significant positive small-to-medium association with eating pathology, as hypothesized.

In contrast to study hypotheses, the General Attractiveness subscale in men was not correlated with measures of eating pathology, except a significant, small positive correlation with the Shape Concern subscale of the EDE-Q. In women, the Muscular subscale exhibited significant small positive associations with eating pathology. The General Attractiveness subscale exhibited significant small positive associations with the Restraint and Eating Concern subscales of the EDE-Q but significant large positive correlations with the Shape Concern and Weight Concern subscales and the Global score.

### 3.4. Descriptive analyses

As compared to Schaefer et al. (2017), the current sample of men exhibited significantly higher scores on the Thin/Low Body Fat, $t(767) = 4.83$, $p < .001$, $d = 0.37$, Family, $t(767) = 6.97$, $p < .001$, $d = 0.52$, Peers, $t(767) = 2.10$, $p = .04$, $d = 0.16$, Significant Others, $t(767) = 7.82$, $p < .001$, $d = 0.59$, and Media, $t(767) = 5.14$, $p < .001$, $d = 0.38$, subscales and significantly lower scores on the Muscular subscale, $t(767) = -6.03$, $p < .001$, $d = 0.46$. The samples did not display significantly different scores on the General Attractiveness subscale, $t(767) = 1.10$, $p = .27$, $d = 0.08$. The current sample of women exhibited significantly higher scores on the Family, $t(1028) = 6.01$, $p < .001$, $d = 0.37$, Peers, $t(1028) = 4.56$, $p < .001$, $d = 0.28$, and Significant Others, $t(1028) = 2.73$, $p = .01$, $d = 0.17$, subscales, but did not display significantly different scores on other subscales: Thin/Low Body Fat $t(1028) = -0.16$, $p = .87$, $d = 0.01$; Muscular $t(1028) = -1.38$, $p = .17$, $d = 0.09$; General Attractiveness

$t(1028) = -1.51$, $p = .13$, $d = 0.09$; and Media $t(1028) = -0.71$, $p = .48$, $d = 0.04$.

## 4. Discussion

Overall, the 7-factor structure of the SATAQ-4R scores was supported for SM men and women, bolstering the findings of Schaefer et al. (2017). Evidence for the convergent validity of the SATAQ-4R scores in SMs was acceptable. Many of the expected relationships between SATAQ-4R subscales and measures of eating pathology were found. Similar to the findings of Schaefer et al. (2017), the Muscular subscale exhibited smaller correlations than expected with measures of eating pathology. Given that the EDE-Q has been critiqued by others for primarily measuring thinness-related forms of eating pathology, rather than muscularity concerns (Smith et al., 2017), this finding can be most likely attributed to construct narrowness in the EDE-Q rather than the SATAQ-4R. The large correlation between drive for muscularity and the Muscular subscale lends some weight to this conclusion. Additionally, and again similarly to the findings of Schaefer et al., the General Attractiveness subscale demonstrated small and nonsignificant correlations in men with measures of eating pathology and drive for muscularity. While not tested in this study, Schaefer et al. (2017) found small and nonsignificant relationships between this subscale and self-esteem and body satisfaction. Researchers and clinicians should therefore be advised that the Thin/Low Body Fat and Muscular subscales may be more strongly correlated with negative health outcomes in men such as body dissatisfaction and eating or exercise pathology.

There are limitations that should be noted. First, given that data were collected from a web-based panel, the possibility exists that the psychometric properties of the SATAQ-4R scores from an online sample are different from traditional in-person sampling methods. However, previous meta-analytic findings indicate that the psychometric properties of measures examined in online panel-based samples are similar to traditional methods (Walter et al., 2019). Secondly, this study did not test sexual orientation measurement invariance given the lack of a heterosexual comparison group. Therefore, future research should be conducted to address this limitation, specifically by assessing for factorial invariance and differential item functioning between heterosexual and SM groups to ensure that mean scores can be compared. Lastly, despite the racially diverse sample, this study did not conduct tests of invariance by race and ethnicity, due to sample size limitations. While the current sample was notably more diverse in terms of race and ethnicity as compared to the development sample, this should not be taken as evidence of structural invariance across racial groups. There is some indication that the tripartite influence model may differ in various ethnic and racial minority groups (Javier et al., 2016). Therefore, it is essential to conduct tests of structural invariance the SATAQ-4R scores in diverse racial and ethnic groups, enabling researchers to investigate the relevance of the tripartite influence model for these groups.

Overall, the SATAQ-4R appears to be an adequate measure for the purposes of measuring internalization and pressures within SM populations. From the descriptive findings, it appears that SM populations experience greater pressure to conform to the appearance ideal. Clinicians and researchers alike may therefore consider including measures of internalization and pressures with their clients with body image concerns to identify mechanisms of change in treatment with patients or clinical research trials. Given the paucity of research replicating the tripartite model in SM men and women, researchers are encouraged to utilize this measure to further investigate the tripartite model for validity in this population.

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## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi: https://doi.org/10.1016/j.bodyim.2019.08.013.

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